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* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to an information storage device, and relates to the information storage device which performs retry processing of the count of predetermined especially at the time of error generating. In recent years, information storage devices, such as a disk unit, are receiving high order equipment to a certain time limit more often from improvement in the speed of KOMBYUTASHISUTEMU, and improvement in dependability. Moreover, it is becoming difficult for a disk unit to also have a limitation in error retry processing, although improvement in the speed is progressing every year, and to satisfy the time limit from a high order host for it.
[0002] For this reason, it is necessary to perform retry processing efficiently within the time limit from a high order host.
[0003]
[Description of the Prior Art] The block block diagram of an example of the conventional information storage device is shown in drawing 8 . Here, a hard disk drive unit is explained as an information storage device. A hard disk drive unit 1 is connected to a host computer 2, and the data processed with the host computer 2 are memorized.
[0004] The conventional hard disk drive unit 1 consists of the disk control section 10 and the mechanism section 20. The mechanism section 20 is contained by the sealing case 30. Moreover, the principal part of the disk moveable cooking stove toll section 10 is carried on the circuit board 40, and a part is carried in the sealing case 30. It is fixed to the rear-face side of the sealing case 30 where the mechanism section 20 was contained, and the circuit board 40 is electrically connected with the mechanism section 20 through opening formed in the rear-face side of the sealing case 30. Connection between the mechanism section 20 and the disk control section 10 is made through a flexible printed wiring board (FPC) 50.
[0005] The mechanism section 20 counters the spindle motor 22 and hard disk 21 which rotate the hard disk 21 which memorizes the information from a host computer 2 magnetically, and a hard disk 21 in the direction of arrow-head A, and is prepared. While acting on a disk 21 magnetically and writing information in a hard disk 21 It consists of voice coil motor 25 grades which make radial [of a hard disk 21] (the direction of arrow-head B) rotate the head arm 24 holding the magnetic head 23 which reads information in a hard disk 21, and the magnetic head 23, and a head arm 24.
[0006] The disk control section 10 is arranged on the flexible printed wiring board 50 which connects the mechanism section 20 and the circuit board 40. It connects with the magnetic head 23 and reads. A signal The signal amplified with the head IC 11 to amplify and the head IC 11 It responds to the command supplied from the lead channel (RDC) 12 to which it restores, the hard disk controller (HDC) 13 which takes an interface with a host computer 2, the data to which it restored by the lead channel 12, and HDC13. Retry processing A spindle motor driving signal is generated according to the spindle motor control signal supplied from the control section 14 to control and a control section 14. A voice coil motor driving signal is generated according to the voice coil motor control signal supplied from the spindle motor drive circuit 15 supplied to a spindle motor 22, and a control section 14, and it consists of

voice coil motor drive circuits 16 supplied to a voice coil motor 26.
[0007] In the conventional hard disk drive unit 1, the retry table is prepared in the control section 14, and when it reads to the read request from a host computer 2 and an error occurs to information, retry processing is performed according to a retry table. Retry processing changing various parameters, such as existence of offset, PLL gain, and an AGC hold, and changing reading conditions, by reading again, it is the processing of which reading of the information which can be restored is made possible, and different conditions are set to the retry table in order of predetermined [which was set up beforehand].
[0008] Retry processing is performed until the information demanded in order of the predetermined processing stored in the retry table is read. File equipment as shown in JP,62-66357,A, JP,3-168846,A, JP,8-115226,A, and JP,63-195725,A in order to perform retry processing efficiently at this time for example, is proposed.
[0009] With file equipment as shown in JP,62-66357,A, JP,3-168846,A, JP,8-115226,A, and JP,63-195725,A, each made read-out of efficient information possible by restricting the count of a retry, or retry time amount.
[0010]
[Problem(s) to be Solved by the Invention] However, in the conventional retry management method, all, since retry processing was performed in order of the retry processing beforehand set as the retry table When allowed time restricts the count of a retry, are located on allowed time, and when the execution time of the retry processing cut is large Time amount after retry processing is restricted until it reaches allowed time kept as the complementary sharply, and there was a trouble of being unable to perform efficient retry processing.
[0011] Moreover, when it applied to each equipment, the order of retry processing set as the retry table was not necessarily the the best for the equipment, namely, since it had not become the order of retry processing of the sequence which is easy to restore information, there was a trouble of being unable to perform efficient retry processing. This invention was made in view of the above-mentioned point, and aims at offering the information storage device which can perform retry processing in order of the optimal retry processing for each equipment.
[0012]
[Means for Solving the Problem] Connect with high order equipment and claim 1 of this invention performs reading from a record medium according to the read request from this high order equipment. When it reads to information with this read request and an error occurs In the fixed allowed time beforehand set up by this high order equipment, and the information storage device which performs retry processing of the count of predetermined, the sequence of the contents of said retry processing is changed according to said fixed allowed time beforehand set up by said high order equipment, and the description is carried out for performing retry processing.
[0013] According to claim 1, retry processing can be performed in the most efficient sequence by setting the sequence of retry processing as the sequence which an error tends to generate by setting up the sequence of the contents of retry processing according to the fixed allowed time beforehand set up with high order equipment by the retry processing sequence setting means. Moreover, since retry processing is performed in consideration of the fixed allowed time beforehand set up by high order equipment, interruption of the retry processing by excess of the allowed time of high order equipment can be controlled.
[0014] Claim 2 carries out notifying retry processing interruption to said high order equipment as the description, when said high order equipment has a retry processing interruption directions means direct interruption of said retry processing, after said fixed allowed time progress and receives directions of interruption of said retry processing from said retry processing interruption directions means of said high order equipment.
[0015] When there are interruption directions from high order equipment in the middle of retry processing by establishing the notice means of retry processing interruption according to claim 2, the purport for which retry processing was interrupted on the way by high order equipment can make it recognize by notifying the purport for which retry processing was interrupted to high order equipment.

For this reason, high order equipment can grasp the condition of an information storage device.
[0016]
[Embodiment of the Invention] The block block diagram of the 1st example of this invention is shown in drawing 1 . The same sign is given to the same component as drawing 8 among this drawing, and the explanation is omitted. The hard disk drive unit 100 of this example is different in the hard disk drive unit 1 of the former [configuration / of a control section 110] of drawing 8 .
[0017] A control section 110 The retry table 111 in order of the retry processing developed by RAM112 and RAM112 which are developed by the retry table 111 on which the contents of retry processing were stored for every count of retry processing, the power up, etc. in order of retry processing retry processing in case the retry processing control section 113 and the retry table 111 to perform are developed to RAM112, it consists of the retry processing automatic setting sections 113 set up so that the count of retry processing and sequence can be automatically processed efficiently by permission within a time.
[0018] The contents of processing are beforehand stored in the retry table 111 for every retry processing number at the time of a set. The data block diagram of the retry table of one example of this invention is shown in drawing 2 . The parameter changed for every retry number at the time of retry processing and the execution time are set to the retry table 111.
[0019] The data of this retry table 111 are developed by RAM112 at a power up etc. Sequential execution of the retry processing control section 113 is carried out to the order of retry processing stored in RAM112. The retry processing sequence of RAM113 is automatically set up by the retry processing automatic setting section 113.
[0020] Here, processing in the retry processing automatic setting section 113 is explained to a detail with a drawing. The processing flow chart of the retry processing automatic setting section of one example of this invention is shown in drawing 3 . At the retry processing automatic setting section 113, it is the count Nout of a retry by the host computer 2 first. It judges whether it was specified or not (step S 1-1).
[0021] The retry processing automatic setting section 113 is step S1-1, and is the count Nout of a retry by the host computer 2. Default Nd beforehand set up in the count Nout of a retry at the time of shipment when not set up It sets up (step S 1-2). Moreover, the retry processing automatic setting section 113 is step S1-1, and is the count Nout of a retry by the host computer 2. Indicated value Nh to which the count Nout of a retry was directed with the host computer 2 when directed It sets up (step S 1-3).
[0022] At the retry processing automatic setting section 113 next, it is allowed time Tout by the host computer 2. It judges whether it was specified or not (step S 1-4). Step S At 1-4, it is allowed time Tout by the host computer 2. Allowed time Tout specified when specified A change of retry sequence and a count is made so that it may respond and mention later (step S 1-5).
[0023] Moreover, it is allowed time Tout by the host computer 2 at step S1-4. Retry processing is set up so that only the count of a retry set up by step S1-2 and S1-3 may perform a retry in order of the processing which was specified, and was beforehand set as the retry table 111 when ****. Next, allowed time Tout specified with the host computer 2 of step S1-5 The processing which responds and makes a change of retry sequence and a count is explained.
[0024] The processing flow chart of retry sequence modification processing of one example of this invention is shown in drawing 4 . Step S Count Nout of a retry first set up in retry sequence modification processing of 1-5 step S1-4 or step S1-5 The retry processing time Tn0 to require is computed (step S 2-1).
[0025] Step S Calculation of the retry processing time Tn0 of 2-1 is the retry table 111, and is the count Nout of a retry. It is computed by adding the execution time of the retry number 1 of until - M. Next, retry number Mmax of the retry processing which requires the execution time most with reference to the execution time of the retry number 1 of the retry table 111 - M It asks (step S 2-2). Step S Retry number Mmax which has the greatest execution time found by 2-2 Execution time Tmax It carries out (step S 2-3).
[0026] Next, allowed time Tout set up by step S1-2 or step S1-3 Step S The retry processing time Tn0

set up by 2-1 is compared (step S 2-4). Step S At 2-4, the retry processing time Tn0 is allowed time Tout. If settled inside, let set-up retry processing sequence be retry processing sequence.
[0027] Moreover, the retry processing time Tn0 is allowed time Tout at step S2-4. When it becomes large next, the execution time is the retry number Mmax among the retry numbers more than the retry number M of the retry table 111. Execution time Tmax The execution time Tmin of the following Retry number Mmin It searches and the existence of retrieval is judged (step S 2-5, S2-6).
[0028] Next, the judgment result of step S2-6 and the retry number Mmax Execution time Tmax The execution time Tmin of the following Retry number Mmin When it is able to search, it is the retry number Mmin. The contents and retry number Mmax The contents are replaced (step S 2-7). For example, if [with the retry table 111 of drawing 2] count Nout =of retry 8, for 300ms of the execution time of retry processing of a retry number "2", the retry number 2 is Mmax at the maximum. It becomes and 300ms of execution times is time amount Tmax. It becomes. Retry number "9" By - "18", the retry number for less than 300ms is "9" - "17", and, as for all the execution times, the execution time is set to 35ms.
[0029] For this reason, retry processing of a retry number "9" is made into a retry number "2", and retry processing of a retry number "2" is made into a retry number "9." Moreover, it is the retry number Mmax at step 2-5. Execution time Tmax The execution time Tmin of the following Retry number Mmin When it cannot search, it is the count Nout of a retry. It judges whether it satisfies that it is "1", "Nout <1", (step S 2-8). [i.e.,]
[0030] Step S If it is "Nout <1" in 2-8, a retry will be set up so that it may not perform. step S2-8 [moreover,] -- count Nout of a retry Count Nout of a retry set up by step S1-1 when it was more than "1" from -- "Nout-1" which carried out "1" -- count Nout of a retry It changes and returns to step S2-1 (step S 2-9).
[0031] for example, the retry table 111 of drawing 2 -- count Nout =of retry 18 -- it is -- moreover, allowed time Tout if it is the case of being smaller than the value adding the execution time of the retry numbers 1-18 -- count Nout of a retry from -- 1 -- subtracting -- as count Nout =of retry 17 -- step S -- return and the above-mentioned step S2-1-S2-9 are again repeated to 2-1. Count Nh of a retry specified by the above Or Nd It is a near count of a retry, and is the allowed time Tout of a host computer 2. Retry processing can be set up so that retry processing may be completed less than.
[0032] The sequence which was set as the retry table 111 according to this example is taken into consideration, and it is allowed time Tout. The retry processing whose most it made can be set up. In addition, as the retry sequence modification approach, how to choose the small thing of the execution time as others from the retry table 111 within allowed time is also considered. The processing flow chart of the 1st modification of retry sequence modification processing of one example of this invention is shown in drawing 4 .
[0033] In this modification, first, the retry table 111 is rearranged into the small order of the execution time, and it develops to RAM112 (step S 3-1). next, the order of retry processing developed by RAM112 by step S3-1 -- setting -- step S -- count Nout of a retry set up by 1-2 or S1-2 up to -- the sum total time amount Tn0 of the execution time is computed (step S 3-2).
[0034] next, allowed time Tout specified with the host computer 2 Count Nout of a retry computed by step S2-3 up to -- the execution time Tn0 is compared (step S 3-3). Step S At 3-3, it is the count Nout of a retry. The execution time Tn0 is allowed time Tout. If small, it is allowed time Tout. It is Nout inside. Since retry processing of a time is completed, let retry sequence set up by step S3-1 be retry processing sequence as it is.
[0035] step S3-3 [moreover,] -- count Nout of a retry the execution time Tn0 -- allowed time Tout if large -- count Nout of a retry the execution time Tn0 -- allowed time Tout until it becomes small -- count Nout of a retry from -- "1" is subtracted (step S 3-4, S3-5). Count Nout of a retry Even if it becomes below "1", when the execution time Tn0 does not turn into below the allowed time Tout, it sets up so that retry processing may not be performed.
[0036] As mentioned above, according to this modification, by setting the order of retry processing as the small order of the execution time within allowed time, it can set up so that many retry processings

can be performed in allowed time, and possibility that information can be read can be improved. In addition, although it is not what only rearranged retry sequence into the small order of the execution time, and took into consideration the success probability at the time of a retry, the retry success probability is given and retry sequence may be set up according to a retry success probability.
[0037] Next, the modification which sets up retry sequence according to a retry success probability is explained. In this modification, the configuration of a retry table is different in the retry table 111. Here, the retry table 121 used in this modification is explained.
[0038] The data block diagram of the retry table of the 2nd modification of retry sequence strange modification processing of one example of this invention is shown in drawing 5 . The retry table 121 of this modification is considered as the configuration to which the retry success probability was newly given at the retry table 111 of drawing 2 . A retry success probability is beforehand given from statistics of the retry processing till then etc. for example, at the time of a set.
[0039] A retry success probability is updated by the retry success probability which counted up the retry success probability whenever retry processing was successful, and was suitable for the carried equipment after being developed by RAM112. Next, retry sequence modification processing of this modification is explained. The processing flow chart of the 2nd modification of retry sequence modification processing of one example of this invention is shown in drawing 6 .
[0040] Count Nout of a retry first specified in this modification step S1-2 or S1-3 The retry processing time Tn0 is computed (step S4 -1). Next, count Nout of a retry computed by step S4 -1 The retry processing time Tn0 and allowed time Tout of a host computer 2 It compares (step S4 -2).
[0041] At step S4 -2, it is the count Nout of a retry. The retry processing time Tn0 is the allowed time Tout of a host computer 2. If small, it is allowed time Tout. Since all retry processings set as the retry table 121 inside can be performed, retry sequence is set up so that the contents of the retry table 121 may be performed as it is. Moreover, it is the count Nout of a retry at step S4 -2. The retry processing time Tn0 is the allowed time Tout of a host computer 2. Retry sequence will be rearranged into the high order of the retry success probability given to the retry table 121 if large next (step S4 -3).
[0042] Count Nout of a retry again specified with the host computer 2 after being rearranged into RAM in order of the retry success probability by step S4 -3 The retry execution time Tn0 is computed and it is the count Nout of a retry. The retry processing time Tn0 and allowed time Tout of a host computer 2 It compares (step S4 -4). At step S4 -4, it is the count Nout of a retry. The retry processing time Tn0 is the allowed time Tout of a host computer 2. If small, it is allowed time Tout. Since all retry processings set as the retry table inside can be performed, retry sequence is set up so that the contents of the retry table 121 may be performed as it is.
[0043] moreover, step S4 -4 -- count Nout of a retry the retry processing time Tn0 -- allowed time Tout of a host computer 2 if large -- the retry processing time Tn0 -- allowed time Tout of a host computer 2 until it becomes small -- count Nout of a retry from -- "1" is subtracted one by one (step S4 -5, S4 -6). According to this example, it is the count n0 of permission retry processing. Time-out time amount TOUT beforehand set as a host computer 2 Since it can respond and set up, it is the time-out time amount TOUT. While being able to set up the maximum possible count of retry processing, the contents of retry processing which can perform retry processing efficiently in the set-up count of retry processing can be chosen.
[0044] Moreover, since it can respond according to this example, without changing the command by the side of a host computer 2 etc., implementation becomes easy. In addition, although this example explained the hard disk drive unit as an information storage device, it cannot be overemphasized that it does not restrict to this, connects with a host computer, and can apply to the information storage device which performs retry processing at the time of error generating.
[0045] Moreover, retry processing can be performed in order of the always optimal count of processing, and processing by making a change of the order of retry processing not only for a power up but for every predetermined time amount.
[0046]
[Effect of the Invention] According to claim 1, like ****, according to this invention by setting up the

sequence of the contents of retry processing according to the fixed allowed time beforehand set up with high order equipment by the retry processing sequence setting means for example, by setting the sequence of retry processing as the sequence which an error tends to generate by the count of retry processing maximum by the permission within a time Since retry processing is performed in consideration of the fixed allowed time which can perform retry processing in the most efficient sequence, and is beforehand set up by high order equipment, it has the features of being able to control interruption of the retry processing by excess of the allowed time of high order equipment.

[0047] According to claim 2, by establishing the notice means of retry processing interruption Since the purport for which retry processing was interrupted on the way by high order equipment by notifying the purport for which retry processing was interrupted to high order equipment can make it recognize when there are interruption directions from high order equipment in the middle of retry processing, High order equipment can grasp the condition of an information storage device, and, therefore, has the features of being able to grasp the cause of cutting of an information storage device easily.

[Translation done.]